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- I. *An Account of a Dissertation published in Latin by Dr. Weidler, F. R. S. in the Year 1727, concerning the vulgar Numeral Figures: As also some Remarks upon an Inscription, cut formerly in a Window belonging to the Parish Church of Rumsey in Hampshire: By John Ward, F. R. S. Rhet. Prof. Gresham.*

Read at a Meeting of the Royal Society, June 7. 1744.

SOME Years since I had the Honour to lay before an Assembly of this Learned Body two Papers, concerning the Antiquity and Use of the *Arabian* or *Indian* Figures, and more especially in relation to *England*. And those Papers, being afterwards published in the *Philosophical Transactions* (a), occasioned the learned Dr. *Weidler*, Professor of the Mathematics at *Wittemberg*, and a Member of this *Society*, to transmit to Dr. *Mortimer* a *Dissertation* he had formerly printed upon that Subject (b). Which Discourse coming before the *Society*, they were pleased to refer it to my Perusal and Consideration; of which the following is a brief Account.

The Author begins his Discourse by observing the great Inconveniencies, that the Antients laboured under in their arithmetical Computations, which were usually made with the Letters of their several Languages, dif-

(a) Number 439.

(b) *De characteribus numerorum vulgaribus, & eorum aetatibus, veterum monumentorum fide illustratis, Dissertatio mathematico-critica, a Joan. Frid. Weidlero, F. U. D. & Mathes. P. P. &c. Witemb. 1727. Quarto.*

ferently applied in different Countries. And he thinks it very strange, that, when it was always the Custom to distinguish their Numbers by *Decades*, they should not more early have fallen into the Method of using only ten different Characters, by means of which the largest Sums are now computed with so much Ease and Expedition. But the *Romans*, as he observes, had some Assistance from their *Abacus*, or *Counting Table*; a Description of which, with the Use of it, he has given from *Velfer*, by whom it was first published, and afterwards by *Gruter*, and others (a). And a Draught of the Table may be seen also in the *Philosophical Transactions*, Number 180. I would therefore only beg Leave to make a short Observation or two concerning it. And first I imagine, that the \ominus , which is placed between the two Series of Rings on the Right-hand, may stand for the *Greek Word* $\frac{\text{φραξιωμαλα}}$, *fractions*; as that Order of Rings denotes *Ounces* or *Parts* of the several following *Decades* towards the Left-hand, which are all *Asses* or *Integrals*. Nor was it unusual with the *Romans* to make use of single *Greek* Characters on some Occasions; as we use the *Latin* Letters, *l. s. d.* for *Pounds*, *Shillings*, and *Pence*. I would further remark, that the four Rings, placed by themselves on the Right-hand of the former, are doubtless *Parts* of the Ounce, as *Velfer* explained them. But, whereas *Peireskius* (as our Author observes from *Gafsendus*) thought *Velfer* was mistaken in calling the

(a) *Grut. Inscript. antiq.* ccxxiv. *Pignor. De Servis*, p. 344, ed. 1674. Octavo.

two lowermost of them *Duellas*, or *Thirds of an Ounce*; which he rather took to be *Sextulas*, or *Sixths*: I cannot but differ from both those Opinions, since they make this Order of Rings to disagree with the rest of the Table. For in each of the other Orders the several Rings, differently disposed, are suited to express any Number of Parts contained under it; and all of them together make one short of the Whole. Thus it is in the several *Decades*; and the Rings for Ounces may be so placed separately, as to express any Number under Eleven; and all of them united will make that Number, which falls short of the Ounce by one. But in these Parts of the Ounce, if the two undermost Rings are taken for *Thirds*, they will not apart express either the Number One or Two, nor by any Union the Number Five; and, if considered as *Sixths*, they will no way denote the Number One. And besides, in either Case, the whole Number together will exceed Eleven; that is, one short of the Parts, into which the Ounce was divided: which being an Integral to these, as the *As* was to the Ounce, such Parts of it were doubtless designed to be given here, as would correspond with the rest of the Table, in the Manner already explained. I apprehend therefore, that the two lowest Rings were intended for what *Volusius Maecianus* calls *dimidias Sextulas*, and *Duodecimas* (a); that is, the *Twelfths of an Ounce*; which, with the other two above them, will express any Part of the Ounce from One to Eleven, and so render the whole Table consistent with itself.

(a) See Gronov. *De Sestertiis*, p. 397.

But I return to our Author, who employs the remaining Part of his Discourse in treating of the Antiquity and Use of the *Arabian* or *Indian* Figures. And here, he has given a very particular and accurate Account of the different Opinions of several Writers upon this Subject, but more especially of what *Kircher* and Dr. *Wallis* have said concerning it. The former of whom, as he observes, ventures to fix the precise Time, when the *Europeans* learned them of the *Arabians*; which was occasioned by the Assembly called together by *Alphonsus* King of *Castile*, for settling the *Astronomical Tables*, at which some *Moors* or *Arabians* were present. Now in those Tables, which were finished and published in the Year 1252, the Numbers are expressed in these Characters. *Kircher* thinks likewise, that the *Arabians* first borrowed them from the *Indians* about the Year 900; when, having subdued *Persia*, *Carmania*, and the Coast of *India*, they opened a Commerce with that Country. On the contrary, Dr. *Wallis*, as our Author remarks, has shewn, that these Figures were known to the *Europeans*, and used by them in Books of Astronomy and Arithmetic, long before the Time assigned by *Kircher*. But, as Dr. *Wallis* suspects, that the Characters found in some old Editions of *Boethius De Geometria*, very like the *Arabian* Figures, are different from the Original, or other antient Manuscripts of that Work; our Author acquaints us, that he himself saw in the public Library of the University at *Altorf* a Copy of it, which by the Form of the Letters appeared to him to have been written in the Eighth or Ninth Century; and that both the Shape and Situation of the numeral Characters were

were the same, as in the first Edition printed at *Venice* in 1492. He thinks therefore, that they might be the same, as in the Original of *Boethius*; and endeavours to shew, that they were then used in much the same Manner, as the *Arabian* Figures now are, in Sums of Multiplication and Division. And from thence he concludes, that such Characters must have been known in *Europe*, as early as the Beginning of the sixth Century; since *Boethius* was put to Death by *Theodoricus* King of the *Goths*, in the Year 524. As to the Objection, which may be made to this Opinion, from the Silence of Writers concerning it for several Ages after *Boethius*; he observes, that the same has happened in other Instances of a like Nature. Tho' he supposes, that both the Characters themselves, and the Use of them, was a Secret at that time, known only to Philosophers and Men of Learning, and not introduced into the common Affairs of Life; and that the first Invention of them was owing to the Eastern Nations, from whence they came to the *Greeks*, among whom the *Pythagoreans* were particularly remarkable for concealing their Knowledge from the Vulgar, and imparting it only to their Followers.

For the Illustration of his Discourse, the Author has prefixed to it a *Table* of *numeral Characters*, taken from Writers of different Ages and Countries; together with the *Helmdon Date*, in the Explication of which he follows Dr. *Wallis*: but he offers nothing further, so far as I could observe, in relation to the common Use of them, more early than what I have remarked in my former Papers. With this learned *Dissertation*, he transmitted likewise to
Dr.

Dr. *Mortimer* a small brass Quadrant, with the Numbers engraven upon it in *Arabian* Figures, and the Date when it was made, namely, 1306. In this Quadrant all the Figures agree with those of *Johannes de Sacro Bosco*, except the 2; which in him is inverted thus, 2 (*a*), but on the Quadrant has the present Form.

I had long since delivered in this Paper; but that a reverend and learned Gentleman having communicated to the Society “ An Account of an antient Date “ in *Arabian* Figures, upon the North Front of the “ Parish Church of *Rumsey* in *Hampshire*,” (*b*) I was desirous to get the best Information I could concerning it, in order to lay my Thoughts of it before them at the same time, to prevent the giving a double Trouble. But upon a very strict Inquiry I could not, for a great while, learn any thing further about it. And *Daniel Wray* Esquire, a worthy Member of this Society, was pleased to inform me, that being at *Rumsey* he had examined all the Parts of the Church carefully, but could find no such Date, nor any thing that resembled the Draught, which accompanied the Account. However, at length having by the Favour of the Reverend Mr. *Richard Newcome*, Rector of *Bishops Stoke* in that County, procured the Model of a Window, containing an Inscription not unlike that in the Draught, I now take leave to communicate the same, together with a Drawing of it, as in TAB. Fig. 1. It was found at *Rumsey*, where it served to stop up the Window of a Stable in an empty Inn, to which

(*a*) See *Philos. Transf. n. 439.*

(*b*) See *Philos. Transf. n. 459.*

Place it had probably been long before conveyed ; since none of the Inhabitants remembered its being taken out of the Church, and nothing could then be discovered there, which bore the least Resemblance to it. Upon shewing it to a very skilful Architect, he immediately said, it was the Model of a Church Window ; and that it was the Custom formerly to have such Models made for the Use of the Masons. Some time after I desired Mr. *Peter Newcome*, now a Member of this *Society*, to convey a Copy of the Draught above mention'd to his Brother, the Reverend Mr. *Benjamin Newcome*, who was then in that Neighbourhood, and from whom he soon received the following Account : “ There
 “ was a Window in the North Front, that fell down
 “ thirty Years since, which, the Sexton tells me,
 “ he thinks something resembled the Draught (for
 “ I shewed it to him) as well as he can remember.
 “ That Window was bricked up for twenty three
 “ Years, but about seven Years ago was repaired
 “ and glazed.” But, in the same Letter, speaking of the present State of it, he says : “ I viewed the North
 “ Front, and could not see any Building or Window,
 “ either without or on the Inside, that in the least
 “ resembled the Draught.” From the Sexton’s Account therefore it seems to me not improbable, that there was formerly a Window somewhat in that Form, but larger, in the North Front, and that the Draught sent to the *Society* contains only Part of it ; which being consider’d barely as a Date expressing the Year **1011**, the rest was not attended to. But, upon comparing it with the Model, I could not enter into that Sentiment ; tho’ I had not drawn up my Thoughts

upon

upon it, when I first found it printed in the *Transactions* (a). And I hope, what I now offer, will be esteemed only as an Inquiry after Truth; which in Things of this Nature can often rise no higher than Probability; wherein every one is at Liberty to determine, as he sees Cause.

I suppose therefore, that formerly there was a Window in the Church made after this Model; tho' the Place, where it stood, cannot now be determined, there having been forty Windows stopp'd up in that Church, as Mr. *Newcome* informs his Brother in another Letter. And more than one Window might be built at first by this Model, or with a little Variation from it. Wherefore the Characters being, as I apprehend, the same both in the Model and printed Draught, the same Interpretation may serve for both. Accordingly, I take the upper ones to stand for the Letters **ih̄s**, with a Stroke cross the Top of the **h**, being a Contraction of **ihesus**, as that Name was antiently written in *English*. And the Characters below these, which have been taken for Figures, when put together, make the Name **ion**, as it was likewise formerly written, without an **h**. Both which Words are so spelt in *Wiclif's English* Version of the *New Testament*, published by the Reverend Mr. *Lewis*. And doubtless, had the last Character been designed to express the Number **ii**, the two Strokes would have been kept separate, as they appear in the printed Draught; and not been joined both at the Top and Bottom, in the Form of the Letter **ii**, as

(a) Numb. 459.

we find them in the Model. This Reading agrees very well, with what Mr. *Newcome* mentions in his first Letter; that he heard some Persons at *Rumsey* say, the Church had been dedicated to St. *John*. It seems therefore not improbable, that the Pictures both of *Christ* and St. *John* were formerly painted either in that Window, or near it. And this Opinion I am the more confirmed in from Mr. *Newcome's* Account in the same Letter, that there are three Crucifixes yet remaining about the Church, notwithstanding the many Windows now stopt up, and other great Alterations made in it at different times. One of these is painted on a Window behind the Communion Table, and represents *Christ* bearing his Cross. The second is on the South Wall, the Figure of which is five Feet three Inches high, and represents him in the usual Manner upon the Cross, with his Arms extended, and a Hand above pointing downward. It stands near the Ground, and appears very antient. The third, which is very rudely drawn, is on the Outside of the Church, near the Top of the West Front, in the same Posture as the second, accompanied with the six following Figures. On the Top of the Cross are two Angels. On the Sides are two other Figures in long Garments, designed probably to represent his Mother, and St. *John*, to whose Care he committed her, as we find recorded in his Gospel (*a*). Below are two Soldiers, one on the left Side holding up a Reed with a Sponge at the Top; and the other on the right piercing

(*a*) Chap. XIX. 26, 27.

his Side with a Spear, which latter Circumstance is likewise mentioned only in the Gospel of St. *John* (a). As the Model is cut out of an oaken Board, it may probably, notwithstanding its Thinness, be old enough to consist with the Time of that Spelling; but that it can be so antient as the Year 1011, some experienced Workmen, to whom I shewed it, think it wholly incredible.

The Explication here given may be further confirmed by the symbolical Figures underneath, which seem to be designed as an Emblem of the Trinity joined with the Cross. And it is well known, that St. *John* has treated more largely upon the Divinity of Christ, than any of the other Evangelists. *Plutarch* informs us, that *Xenocrates* the Philosopher resembled the Deity to an equilateral Triangle, the Genii to an *Isofceles*, and Men to a *Scalenum* (b). And a triangular Figure has been since applied by Christians to represent the Trinity, sometimes singly, and at other times with additional Lines expressing a Cross, as in this Model. So we find them variously combined upon the Medals of the Popes published by *Bonanni* (c). And nothing was more frequent formerly with Printers, than to place these complex Figures in the Front of their Books, at first doubtless

(a) Chap. xix. 34.

(b) Παράδειγμα δὲ τῷ λόγῳ Ξενοκράτους μὲν ὁ Πλάτωνος ἑταίρος ἐποίησατο τὸ τῶν τριγῶνων, θεῶν μὲν ἐπεικάσας τὸ ἰσόπλευρον, θεῶν δὲ τὸ σκαληνὸν, τὸ δὲ ἰσοσκελὲς δαιμονία· τὸ μὲν γὰρ ἴσον πάντη τὸ δὲ ἄνισον πάντη τὸ δὲ πῆ μὲν ἴσον, πῆ δ' ἄνισον, ὡσπερ ἡ δαιμόνων φύσις ἔχουσα καὶ πάθος θεῶν καὶ θεῶν δύναμιν. *De defectu oraculorum*, edit. H. Steph. 1572. Vol. I. p. 740.

(c) *Numismata Pont. Rom. ed. Rom. 1699. fol.*

with a religious Intent, till at length by common Use, and being joined with other Devices, they became only Prefs-marks, and Badges of Distinction among the Trade; as they now are with Merchants, who mark their Goods with them both here and abroad.

A like Event has happened to another Character, made up of the *Greek* Letters X and P joined in this manner **XP**, which we first meet with in some large brass * Coins of the *Ptolemeys*, Kings of *Ægypt*, where it was placed on a civil Account. Some Writers have taken it for a Date, and others for the initial Letters of a proper Name (a). But as no Reasons are assigned for either of those Conjectures, I would rather suppose it an Abbreviation of the Word *XPHMA*, *Money*, impressed on those Pieces to denote their Currency as Money. Which might be thought proper, as they have not the Heads of the Kings stamped upon them, like their Silver and Gold Coins; but always that of *Jupiter* on the Front, and an Eagle perched on a Thunder-bolt upon the Reverse (b). And in that respect they seem to agree with such brass Medalions of the *Romans*, as we find stamp'd with the Letters *SC*; which in the Opinion of a judicious Antiquary were designed to intimate, that after they had been dispersed as Largeesses to the Populace, they were to pass for Money, like the common brass Coins marked with those Letters by the Authority of the Senate (c). An Impression of

(a) Pignorius *Epist.* 24.
χρημάτων.
ed. 1739.

(b) See Suidas in the Word
 (c) *La Science des Medailles*, Tom. I. pag. 211.

one of those *Greek* Coins above mentioned is here annexed (*a*), with which I was favoured by our honoured President. And it is well known, that the Monogram, which appears on it, was afterwards applied to a very different Purpose by the Emperor *Constantine* the Great, who made use of it to denote the Name XPICTOC, and placed it both on his Coins and military Ensigns; wherein he was followed not only by some of the succeeding Emperors, but also by private Persons, who out of Devotion put it on their Lamps and other Utensils (*b*). But afterwards it came to be used merely as a critical Note, to point out remarkable Passages in Manuscripts; as in later Times an Hand, with the Fore-finger extended, has been placed for the like Purpose in the Margin of printed Books. And then it stood for the initial Letters of the *Greek* Word XPHCIMON, *useful*, as we learn from *Isidore* (*c*). Other Instances might be produced of the like Nature, wherein Things have deviated from their original Use, and served different Purposes; but I forbear giving further Trouble to this Assembly on such minute Matters, and hope the Nature of the Subject will plead my Excuse, for what has been said already.

I shall only beg Leave to communicate the Copies of two antient Dates in *Arabian* Figures, which were imparted to me by the Reverend Dr. *William Warren*, Senior Fellow of *Trinity-Hall* in *Cambridge*. They were both taken by himself, and are of the same

(*a*) See TAB. Figure II. (*b*) *Casalius De sacris Christian. ritibus*, p. 227. *Pignorius De Servis*, p. 32. ed. 1674. *Octavo*. (*c*) *Orig. lib. 1. cap. 20.*

Size with the Originals. One is cut on a Beam running from the North-East Corner of the Steeple to the School in the Church of *Ashford* in *Kent*, and expresses the Year 1295 (a). The other is cut in a Beam (over a great Passage) that is Part of a very old House at *Cambridge*, called the *Half-Moon*, near *Magdalen-College*, and denotes the Year 1332 (b). The Figures of both are very rude, agreeable to those Times, being the oldest I have yet met with, except those at *Helmdon* (c).

II. *A Letter from the Rev. Mr. Joseph Betts, M. A. and Fellow of University College, Oxon. to Martin Folkes, Esq; Pr. R. S. containing Observations on the late Comet, made at Sherborn and Oxford; with the Elements for computing its Motions.*

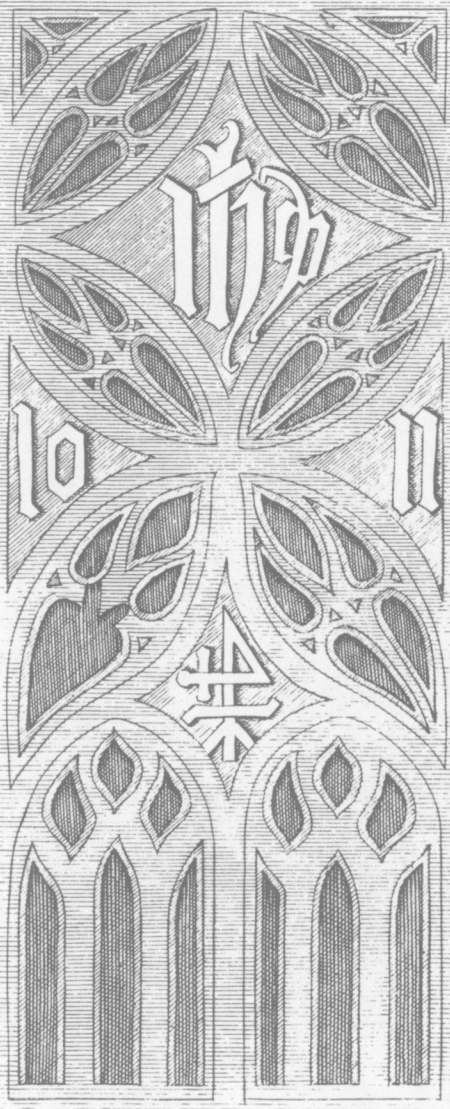
Read June 14.
1744.

THE Comet which appeared towards the End of last *December*, and in the following Months *January* and *February*, 1744. was first seen in *England*, at the Observatory of the Right Honourable the Earl of *Macclesfield*, *Dec. 23.* between 5 and 6 o' Clock in the Evening. It formed, at that time, an obtuse-angled Triangle, with (α) of *Andromeda*, and (γ) *Pegasi*, the Comet being at the

(a) See TAB. Figure III. (b) See TAB. Figure IV. (c) See Philos. Transact. n. 439.

obtuse

Figure I. p. 34.



A Scale of 9 Inches

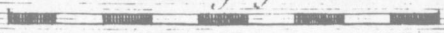


Fig. III. p. 91.

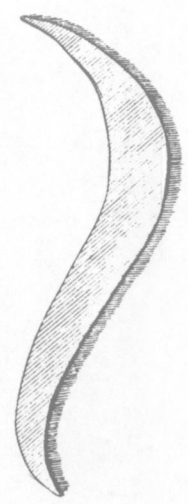


Fig. IV. p. 91.

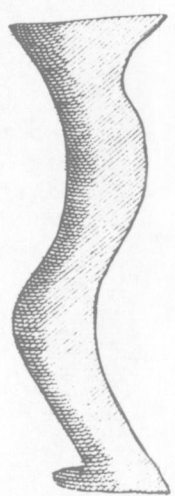
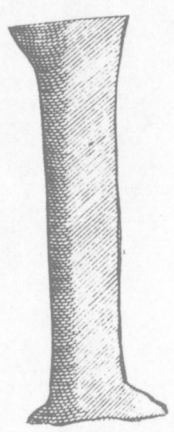


Fig. III. p. 91.

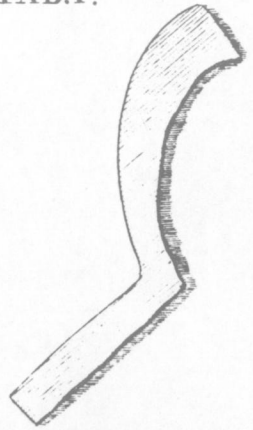
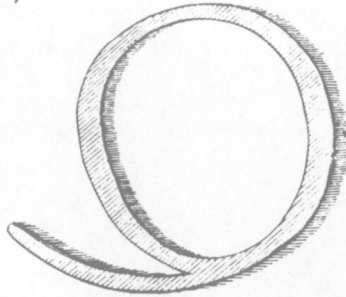
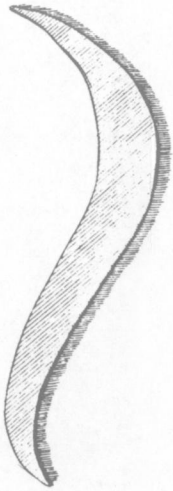


Fig. II.



Fig. IV. p. 91.

